

Major Depressive Disorder in Long-Term Cancer Survivors: Analysis of the National Comorbidity Survey Replication

William F. Pirl, Joseph Greer, Jennifer S. Temel, Beow Y. Yeap, and Stephen E. Gilman

ABSTRACT

Purpose

Prior research is mixed as to whether long-term cancer survivors (LCSs) have higher rates of depression than the general population. This is the first study to compare the rates of major depressive disorder (MDD) between LCSs and people without cancer histories in a nationally representative cross-sectional multistage cluster survey sample, the National Comorbidity Survey-Replication (NCS-R).

Methods

Between 2001 and 2003, face-to-face interviews were conducted for the NCS-R in a national sample of 9,282 people, of whom 5,692 were assessed for a history of cancer. Participants with cancer diagnoses at least 5 years before the interview were considered LCSs. Survivors of childhood cancers were excluded. Comparing LCSs to those without a cancer history, odds ratios for having a MDD episode in the last 12 months before interview were obtained using multiple logistic regression controlling for demographic and medical variables. Differences in characteristics of those MDD episodes were also compared between groups.

Results

Of participants age 23 years or older, 243 LCSs and 4,890 adults without a cancer history were identified in the sample. Adjusting for demographic variables and medical comorbidities, LCSs did not have increased odds of MDD in the last 12 months, with an odds ratio of (OR) 0.99 (95% CI, 0.55 to 1.79). LCSs reported higher mean levels of impairment from MDD in their home, social, and work life, but these differences were not significant.

Conclusion

LCSs do not appear to have elevated rates of MDD. However, they may experience greater impairment from MDD compared to those without cancer. Longitudinal studies are needed to confirm these findings.

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INTRODUCTION

More than 10 million cancer survivors are currently living in the United States.¹ A national goal of Healthy People 2010 is to increase the percentage of people with cancer who are alive 5 years after diagnosis from 59% to 70%.² As the population of cancer survivors grows, our medical system must respond to their specialized health needs, such as monitoring for late effects of cancer treatments and screening for second cancers. While addressing psychosocial health needs has been recognized as a necessary part of quality care for cancer survivors in a recent Institute of Medicine report, the extent of actual psychiatric disorders in long-term cancer survivors (LCSs) remains unknown.³

Stresses related to surviving cancer, such as persistent physical symptoms, financial burden, and concerns over potential recurrence may put LCSs at

greater risk for developing a psychiatric disorder.⁴ Using data from the National Health Interview Survey of 95,615 adults, Hewitt et al⁵ found that cancer survivors were twice as likely to report functional impairment from psychological symptoms compared with those without cancer histories. However, data from the survey did not allow exploration of the types of psychiatric disorders contributing to this impairment.

Major depressive disorder (MDD) is a leading cause of functional impairment in people regardless of cancer history and has been shown to be associated with lower rates of returning to work specifically in cancer survivors.⁶ Although numerous studies have documented high rates of MDD in people recently diagnosed with or being treated for cancer (10% to 25% compared to 6.6% in the general population),^{7,8} few data exist on its occurrence in LCSs.

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Previous research examining depressive symptoms in adult LCSs have not consistently found elevated rates. Although population-based studies comparing long-term survivors of colorectal cancer to matched or normative reference populations have found higher levels of depressive symptoms, similar studies in breast and testicular cancer survivors have shown no differences in rates.⁹⁻¹² In addition, an analysis of the Health and Retirement Survey which included 16,696 people age 55 or older, revealed that LCSs were not more likely to have elevated depression scores on the Center for Epidemiological Studies Depression Scale (CES-D).¹³

All previous studies of LCSs utilized scales of depressive symptoms rather than applying diagnostic criteria for MDD. Symptom scales, like the CES-D, measure the level of depressive symptoms and are often used as screening tools. While many of these scales have cutoff scores that may provide some rough approximation of rates of MDD, they do not necessarily correspond to actual diagnostic cases of MDD. Therefore, it is unclear whether differences in the level of depressive symptoms between groups reflect underlying differences in rates of clinically significant disorder.

This study estimates the prevalence of MDD in LCSs in an analysis of a large, nationally representative sample, the National Comorbidity Survey-Replication (NCS-R). The NCS-R has the advantages of diagnostic assessment of MDD according to the *Diagnostic and Statistical Manual of Mental Disorders* (ed 4: DSM-IV) as well as the collection of data on cancer history that allows a rigorous definition of a long-term survivor.¹⁴

We compared the rates of MDD in the 12 months before the survey interview between LCSs and controls without a history of cancer, controlling for demographic and medical variables. We hypothesized that LCSs would have higher rates of MDD in the past 12 months compared to controls. We also explored possible differences in the characteristics of the MDD episodes between the two groups, such as levels of impairment, rates of professional treatment for the MDD episode, and histories of previous MDD episodes. Among those with MDD within the last 12 months, we hypothesized that LCSs would report greater levels of impairment and higher rates of having a previous MDD episode. Because of their prior exposure to the medical system from their cancer care, greater rates of professional treatment for the MDD episode were hypothesized for the LCSs.

METHODS

NCS-R

This study used the public access database of the NCS-R (http://www.hcp.med.harvard.edu/ncs/ncs_data.php). The NCS-R, a cross-sectional multistage cluster area probability survey, was conducted in the United States in 2001 to 2003; full details of the methodology are available elsewhere.¹⁵ All noninstitutionalized residents of the 48 contiguous states were eligible for selection. Residents of military bases, nursing homes, and chronic care facilities were excluded. Potential participants were drawn from a multistage sampling process that consisted of probability samples first of counties or metropolitan areas, then units of 50 to 100 households, and then a household. Once a household was selected, a potential participant was randomly chosen from English-speaking residents older than 18 years of age. The overall participation rate was 74.6%.

The survey was a two-part in-person interview conducted by trained lay interviewers. Part one was administered to all participants (n = 9,282) and covered lifetime psychiatric disorders and demographic data. Part two of the interview was administered to a subset of participants (n = 5,692) from three

groups: all those reporting any psychiatric disorder in their lifetime, 59% of those who were subthreshold for a psychiatric disorder or reported receiving mental health services, and 25% of those who neither met criteria for psychiatric disorders nor reported receiving mental health services. Part two of the survey included a more extensive interview that collected data on risk factors, additional psychiatric diagnoses, and medical comorbidities. The final data were assigned weights to adjust for differential probabilities in selection, non-response, and poststratification differences in demographic variables, which ultimately approximated data from the 2000 US Census.¹⁵

Measures

Psychiatric diagnoses were determined using the WHO's Composite International Diagnostic Interview based on DSM-IV criteria. For MDD, this would consist of at least 2 weeks of persistently low mood and loss of interest as well as having at least five of the following symptoms: sleep disturbance, feelings of guilt/hopelessness/helplessness, low energy, poor concentration, appetite disturbance, psychomotor retardation/agitation, and suicidal thoughts. The presence of a diagnosis of MDD at the time of the interview, within the last 12 months from the interview, and over the lifetime was assessed. Participants may have reported more than one episode of MDD over the last 12 months, but only the most recent episode within that timeframe was verified using diagnostic criteria.

Among those who met criteria for a MDD episode within 12 months before interview, additional questions were asked to describe the episode. Participants were asked to rate the level of impairment from MDD on a scale from 0 (no impairment) to 10 (very severe impairment) in their abilities to take care of their house/apartment and work, as well as maintain their social life. They were also asked if they received treatment for the episode within the last 12 months by a professional (medical doctor, psychologist, counselor, and so on) and if they had any prior episodes of MDD.

Long-Term Cancer Survivorship

In part two of the NCS-R survey, all participants were asked about a list of health problems that they might have had at any time in their lives. If they indicated a cancer history, they were asked about their current status (in treatment, cured, in remission, or don't know) and age at diagnosis. Consistent with the Healthy People 2010 goal, LCSs were defined as those who reported being diagnosed with cancer at least 5 years before the interview. Participants who received a cancer diagnosis fewer than 5 years before the interview were excluded. Because of possible effects of cancer on psychological development, we excluded participants who reported having childhood cancers. Controls were those without a cancer history. We limited the full sample to participants who were at least 23 years old because our definition of LCSs results in survivors who could be no younger.

Demographic and Medical Covariates

The following demographic variables previously shown to be associated with rates of MDD were covariates: age, sex, marital status (married/cohabitating, divorced/separated/widowed, or never married), race (white, black, Hispanic, or other), education (fewer than 12 years, high school graduate, some college, or college graduate) and household income.⁸ In the NCS-R database, the race variable was imputed. We also examined five medical comorbidities (histories of heart disease/heart attack, chronic lung disease, diabetes, arthritis, and high blood pressure) and smoking history (current or former smoker v never smoker) as covariates that might confound the relationship between MDD and LCSs.

Statistical Methods

Differences in the demographic and medical covariates between LCSs and controls were examined in the full sample using univariate analyses, independent *t*-tests for continuous variables, and Pearson χ^2 tests for categorical variables.

Because LCSs were expected to differ significantly from controls on several demographic and medical variables, multiple logistic regression was used to control for all demographic and medical variables. Multiple logistic regression was used to obtain unadjusted and adjusted odds ratios for MDD in the past 12 months for LCSs compared to controls.

Table 1. Sample Demographic and Medical Characteristics

Characteristic	Long-Term Cancer Survivors (n = 243)		No Cancer History (n = 4,890)		P
	No.	Weighted Sample (%)	No.	Weighted Sample (%)	
Mean weighted age		63.17		47.52	< .001
Sex					.07
Male	76	40.26	2,066	47.00	
Marital status					< .001
Married	138	60.04	2,604	55.79	
Divorced	94	36.83	1,345	26.12	
Never married	11	3.13	937	18.09	
Race					.001
White	205	86.83	3,609	73.64	
Hispanic	10	5.42	435	10.46	
Black	14	4.11	617	12.04	
Other	14	3.63	229	3.87	
Education					.08
< 12 years	44	17.04	676	15.80	
High school graduate	72	32.23	1,438	31.76	
Some college	61	24.69	1,440	26.58	
College graduate	66	26.04	1,336	25.86	
Mean weighted household income, \$		57,279		60,696	.26
Heart disease/heart attack	38	18.42	350	7.24	.002
Chronic lung disease	18	4.63	123	2.29	< .001
Diabetes	26	9.25	380	8.01	.60
High blood pressure	96	40.58	1,248	25.84	.002
Arthritis	130	55.63	1,428	29.11	< .001
Current or former smoker	150	58.97	2,616	51.90	.79

NOTE. Rates compared with Pearson χ^2 tests; means compared with independent *t*-tests.

Among those meeting criteria for MDD within the last 12 months, differences in impairment between LCSs and controls were tested with independent *t*-tests. Differences in rates of treatment for the MDD episode and histories of MDD before past 12 months were tested with Pearson χ^2 tests.

All analyses were weighted using the NCS-R sampling weights, and accounted for the multistage cluster area probability sampling design done using SUDAAN (version 9.0; Research Triangle Institute, Research Triangle Park, NC). While sample sizes presented in the results correspond to actual number of NCS-R participants, prevalences are based on weighted data. A two-sided *P* value of lower than .05 was considered significant.

RESULTS

Sample

The entire sample of NCS-R participants who completed part two of the interview contained 383 participants who reported a history of cancer and 5,309 people without a history of cancer. Compared to estimates of the distribution of ages derived from Surveillance, Epidemiology, and End Results data at the time of the survey, cancer survivors in this sample tended to be younger; 61% were older than 65 years in the SEER estimate of all people with cancer compared to 50% in this community-dwelling sample.² Of those who reported a history of cancer, 369 were diagnosed at 18 years or older, and 243 of those met our definition of LCSs, having been diagnosed with cancer at least 5 years before the survey interview. The control group contained 4,890 people without a history of cancer age 23 years or older. Table 1 details the demographics of the participants in our final analytic sample, which shows that LCSs were significantly more likely to be older; married; white; and have greater medical comorbidity, with higher

rates of heart disease, chronic lung disease, high blood pressure, and arthritis than controls. The two groups also did not differ significantly in sex, education, household income, diabetes diagnosis, and smoking histories.

Among the LCSs, mean age at cancer diagnosis was 43.22 years (SEM, 1.38 years); mean time since cancer diagnosis was 15.93 years (SEM, 0.97 years). As detailed in Table 2, breast, skin, and cervical cancers were most common types of malignancies, comprising 55.91% of the weighted sample.

Table 2. Distribution of Specific Cancer Diagnoses in Long-Term Cancer Survivors in the Sample

Cancer Type	No. of Survivors	Weighted Sample (%)
Breast	48	24.94
Skin (melanoma)	46	20.28
Cervical	39	10.69
Uterine	23	7.86
Prostate	15	10.01
Colon	11	7.03
Ovarian	7	1.81
Lung	5	2.14
Lymphoma/leukemia	5	1.78
Other	62	26.70
> 1 type	15	3.29

NOTE. Because some participants reported having more than one cancer, the percentages do not add up to 100%.

Table 3. Rates of MDD in Past 12 Months in Long-Term Cancer Survivors

Parameter	No. of Survivors	Weighted Sample (%)
Treatment status		
In treatment	0	0
Not in treatment	22	5.88
Time from cancer diagnosis, years		
5-10	7	3.74
11-15	8	14.45
> 15	7	4.17

Abbreviation: MDD, major depressive disorder.

MDD in Past 12 Months

The prevalence of MDD did not differ significantly between LCSs and controls, with twenty-two LCSs (5.38%) and 563 controls (6.78%) reporting an episode of MDD in the past 12 months. The unadjusted OR for MDD in the past 12 months in LCSs compared to controls was 0.78 (95% CI, 0.44 to 1.36; $P = .38$). Adjusting for age, sex, education, income, marital status, race, individual medical comorbidities, and smoking history, there was no difference in the risk of MDD within the past 12 months between LCSs and controls (OR, 0.99; 95% CI, 0.55 to 1.79; $P = .98$). Finally, among the LCSs only, rates of MDD within the last 12 months with respect to cancer treatment status and length of survivorship are presented in Table 3. While no LCSs who were currently receiving cancer treatment reported MDD within the last 12 months, there were only 18 participants in that group.

Comparison of MDD Characteristics

Table 4 summarizes the characteristics of MDD episodes for only participants meeting criteria for MDD within 12 months before the interview. LCSs and controls did not differ significantly in histories of previous episodes. Although LCSs reported higher levels of impairment in their home, work, and social lives compared to controls, there were no statistically significant differences from controls. Finally, while LCSs appeared less likely to have received professional treatment for MDD in the past 12 months compared to controls, there was no statistically significant difference between groups. Because data on treatment was missing for 187 of those with MDD (32%), this comparison should be treated with caution.

DISCUSSION

Compared to individuals without cancer histories, adult LCSs did not appear to have higher rates of MDD within the past 12 months in this nationally representative community-dwelling sample. While consistent with reports of no differences in levels of depressive symptoms in the analysis of an older population in the Health and Retirement Study and investigations of survivors of specific cancer types,¹¹⁻¹³ these findings may not generalize to LCSs excluded from the survey, such as those living in chronic care facilities.

The higher levels of depressive symptoms previously reported in survivors of colorectal cancer could be explained by differences in method (ie, use of symptom scales rather than diagnostic interviews for MDD, which reflect clinically significant psychopathology as opposed to either transient or minor elevations in mood symptoms) or sampling (ie, single v multiple cancer types). Unfortunately, we were unable to analyze data by cancer type due to the relatively small number of survivors with each malignancy. In addition, while higher prevalence of MDD has been reported in people closer to the time of cancer diagnosis, rates of MDD may decline over time in cancer survivors, approaching the rate of the general population by year 5 and beyond. This trajectory is partially supported by the work of Polsky et al¹⁷ who also analyzed the Health and Retirement study data, observing that the rates of elevated depressive symptoms peak within 2 years of cancer diagnosis and then decline. However, in contrast to the findings of our study, the investigators also observed rates of elevated depressive symptoms again in cancer survivors between years 4 to 8 after diagnosis.

While rates of MDD may not differ between LCSs and those without a history of cancer, a substantial number of individuals in both populations (5% to 7%) experienced MDD in the past 12 months. Recognizing the possible effects of MDD on health care utilization and adherence to medical treatments, MDD may interfere with participation in follow-up screenings and health-promoting behaviors such as exercise, as well as possibly even contribute to cancer recurrence.^{18,19} Greater levels of impairment were reported on average by LCSs who experienced MDD in the previous 12 months, especially in terms of work impairment, but the power to detect a statistically significant difference from controls was limited by the small numbers in the LCSs subgroup with MDD. Given the charge by the recent Institute of Medicine report to address psychosocial health needs as part of quality cancer care, the recognition and treatment of MDD should certainly be part of this practice. LCSs appeared less likely to

Table 4. Characteristics of MDD Episodes in the Last 12 Months

Parameter	Long-Term Cancer Survivors (n = 22)			No Cancer History (n = 563)			P
	No.	Weighted Sample (%)	SEM	No.	Weighted Sample (%)	SEM	
History of previous MDD episode prior to last 12 months	15	67.09		211	64.24		.76
Mean weighted impairment in caring for home	5.68		0.63	5.34		0.13	.59
Mean weighted impairment in work	5.63		0.64	4.78		0.13	.20
Mean weighted impairment in social life	5.42		0.66	4.97		0.15	.50
Received professional treatment for episode*	6	37.65		225	58.21		.18

NOTE. Rates compared with Pearson χ^2 tests; means compared with independent t -tests.

Abbreviations: MDD, major depressive disorder.

*Long-term cancer survivors, n = 15; no cancer history, n = 383.

have received professional treatment for MDD in this sample, but that difference was not statistically significant and the amount of missing data for that item renders that comparison as questionable.

Several methodological issues might have limited our ability to detect differences in the rates of MDD between LCSs and individuals without a history of cancer. One potential problem is the validity of the self-reported cancer histories. False-negative rates in epidemiological studies have been reported as high as 39%.²⁰ However, overall prevalence of cancer histories of any type in the entire sample is 6.7%, which is higher than an estimate of 3.5% derived from SEER data obtained during the timeframe of the survey. This discrepancy could be the result of an oversampling of people with cancer histories because of the sampling strategies for participation in part two of the survey. For example, LCSs may have been more likely to meet criteria to participate in part two because of possible higher rates of suicidal ideation and mental health care utilization.²¹⁻²³

Other limitations of this study include its cross-sectional design and certain aspects of data collection. Cancer histories and rates of MDD over the lifetime and in the past 12 months are dependent on the recall of participants. Because the study did not collect information on cancer stage, histological type, and treatment history, we are unable to conduct sub-group analyses to identify groups that might be at higher risk. Also a small percentage of LCSs (< 5%) reported having more than one cancer, although survey data on the date of diagnosis and treatment status were only collected for the first cancer mentioned. Participants with more recently diagnosed second or third cancers may no longer fit the definition of LCSs used in this investigation. Lastly, this analysis was dependent on data collected as part of the NSC-R; therefore, it is possible that the confounding effects of unmeasured variables masked an underlying association between LCSs and depression. However, we were able to adjust for the most likely factors that could lead to a spurious association between LCSs and MDD (ie,

demographic variables, medical comorbidities, and smoking), which are known to be associated with a higher risk for both cancer and MDD. Longitudinal studies with larger numbers of cancer survivors are needed to address these concerns.

To our knowledge, this is the first study to report the rate of a diagnosis of MDD in a population-based sample of LCSs. While LCSs did not have an elevated rate of MDD in this sample, they may nonetheless face significant psychological challenges. The increased odds of cancer survivors reporting psychological impairment as noted by Hewitt et al⁵ does not appear to be driven by higher rates of MDD. If higher rates of psychological distress in LCSs do in fact exist, they may be the result of other psychiatric disorders, psychological symptoms not meeting criteria for a psychiatric disorder, and/or symptoms that do not fit into current psychiatric diagnostic categories. As guidelines for the medical care of LCSs evolve, further research is needed on other psychiatric disorders and symptoms to inform these recommendations and to focus efforts at targeted interventions.

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

The author(s) indicated no potential conflicts of interest.

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REFERENCES

1. Institute of Medicine Committee on Cancer Survivorship: Improving Care and Quality of Life, National Cancer Policy Board: Introduction, in Hewitt M, Grenfield S, Stovall E (eds): From Cancer Patient to Cancer Survivor: Lost in Transition. Washington, DC, The National Academies Press, 2006, pp. 17-22
2. Rowland J, Mariotto A, Aziz N, et al: Cancer survivorship: United States, 1971-2001. *MMWR* 53: 526-529, 2004
3. Institute of Medicine, Committee on Psychosocial Services to Cancer Patients/ Families in a Community Setting, Board on Health Care Services: Cancer Care for the Whole Patient: Meeting Psychosocial Health Needs. Washington, DC, The National Academies Press, 2007
4. Alfano CM, Rowland JH: Recovery issues in cancer survivorship: A new challenge for supportive care. *Cancer J* 12:432-443, 2006
5. Hewitt M, Rowland JH, Yancik R: Cancer survivors in the United States: Age, health, and disability. *J Gerontol A Biol Sci Med Sci* 58:82-91, 2003
6. Spelten ER, Verbeek JH, Uitterhoeve AL, et al: Cancer, fatigue, and the return of patients to work: A prospective cohort study. *Eur J Cancer* 39:1562-1567, 2003
7. Pirl WF: Evidence report on the occurrence, assessment, and treatment of depression in cancer patients. *J Natl Cancer Inst Monogr* 32:32-39, 2004
8. Kessler RC, Berglund P, Demler O, et al: The epidemiology of major depressive disorder: Results from the National Comorbidity Survey Replication (NCS-R). *JAMA* 289:3095-3105, 2003
9. Ramsey SD, Berry K, Moinpour C, et al: Quality of life in long term survivors of colorectal cancer. *Am J Gastroenterol* 97:1228-1234, 2002
10. Arndt V, Merx H, Stegmaier C, et al: Quality of life in patients with colorectal cancer 1 year after diagnosis compared with the general population: A population based study. *J Clin Oncol* 22:4829-4836, 2004
11. Ganz PA, Rowland JH, Meyerowitz BE, et al: Impact of different adjuvant therapy strategies on quality of life in breast cancer survivors. *Recent Results Cancer Res* 152:396-411, 1998
12. Dahl AA, Haaland CF, Mykletun A, et al: Study of anxiety disorder and depression in long-term survivors of testicular cancer. *J Clin Oncol* 23:2389-2395, 2005
13. Keating NL, Norredam M, Landrum MB, et al: Physical and mental health status of older long-term survivors. *J Am Geriatr Soc* 53:2145-2152, 2005
14. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders (ed 4). Washington, DC, American Psychiatric Association, 1994
15. Kessler RC, Berglund P, Chiu WT, et al: The US National Comorbidity Survey Replication (NCS-R): Design and field procedures. *Int J Methods Psych Res* 13:69-92, 2004
16. Reference deleted
17. Polsky D, Doshi JA, Marcus S, et al: Long-term risk for depressive symptoms after a medical diagnosis. *Arch Intern Med* 165:1260-1266, 2005
18. Shinn EH, Basen-Engquist K, Thornton B, et al: Health behaviors and depressive symptoms in testicular cancer survivors. *Urology* 69:748-753, 2007
19. Spiegel D, Giese-Davis J: Depression and cancer: Mechanisms and disease progression. *Biol Psychiatry* 54:269-282, 2003
20. Desai MM, Bruce ML, Desai RA, et al: Validity of self-reported cancer history: A comparison of health interview data and cancer registry records. *Am J Epidemiol* 153:299-306, 2001
21. Schairer C, Brown LM, Chen BE, et al: Suicide after breast cancer: An international population-based study of 723,810 women. *J Natl Cancer Inst* 98:1416-1419, 2006
22. Druss B, Pincus H: Suicidal ideation and suicide attempts in general medical illnesses. *Arch Intern Med* 160:1522-1526, 2000
23. Hewitt M, Rowland JH: Mental health service use among adult cancer survivors: Analyses of the National Health Interview Survey. *J Clin Oncol* 23: 4581-4590, 2002